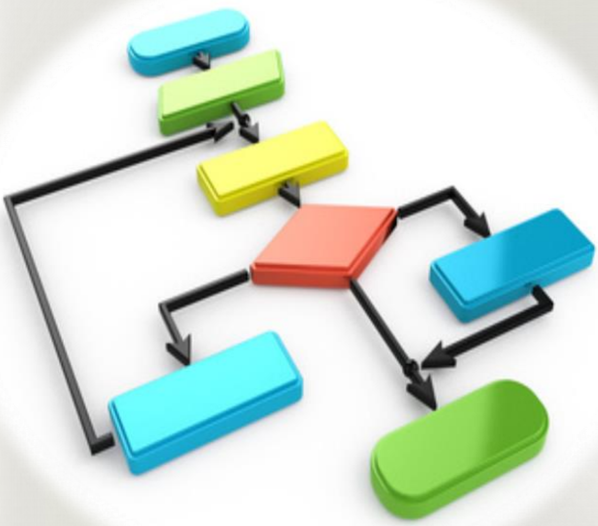
Arab Republic of Egypt
Ministry of Education
General Administration For
Developing Computer and Information Technology

Computer and Information Technology





Third grade preparatory
First semester
2017/2018

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Introduction

Dear students, we offer this book in computer and information technology, as amended and revised by a group of university professors and experts who specialize in this area. We hope to keep you informed of the latest developments in era of technology to keep pace with scientific development in problem solving, flowcharts and the basics of programming through the dot-net style. This is done in a simplified manner as the first step in the path of programming. This branch is very up to date; the world of computers and information technology relies greatly on it as we are going to see through the first and second semester books.

The work team

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Chapter One

Problem Solving

By the end of this chapter, student will be able to:

- Define the problem.
- Identify the problem solving stages.
- Write steps to solve the problem “Algorithm”.
- Draw flowcharts that reflect the steps of the solution.

PREFACE

In your daily life, you may face a lot of problems through various activities that contain many problems.

A problem:

Problem is a situation that requires a solution or an objective you want to achieve through following consecutive steps sequentially.

1-1 Problem Solving:

Problem Solving is the steps, activities, and processes to be done to reach an output or objective.

Consider the following problem:

The problem is: Baking a cake according to certain specifications, input available are the ingredients (such as eggs, flour, milk …etc.), then followed by activities or procedures that should be done sequentially to get the cake in suitable shape.

Dear student

In this book, we focus on Problem Solving techniques using the computer.



1-2 Problem Solving Stages:

Stages of solving problems pass through several steps are:

First: Problem Definition:

Problem definition implies the identification of required outputs, available inputs and, arithmetic and logical operations to be executed.

Second: Algorithm Preparation:

Algorithm is one of the methods used to solve a problem through logically arranged procedures.

After identifying and analyzing the problem, outputs and inputs; a plan in the form of a series of successive steps is made which is called an (Algorithm), devised by the Mathematician and the founder of Algebra "**Muḥammed Ibn Mūsā al-Jwārizmī**".

One of the methods to represent algorithm is **flowchart**.

Flowchart:

It is a diagram that uses standard graphical symbols to illustrate the sequence of steps required for solving a problem or specific question.

Some advantages of flowcharts:

- Facilitating the reading and understanding of the problem and illustrating to the programmer what must be done.
- Useful to explain the program to others
- helping in documenting the program in better manner, especially if the program is complicated

Third: Program design

Having drawn a "Flowchart" to solve the problem, using a computer; we have to translate this flowchart into one of the programming languages.

Fourth: Program Testing

During writing a program we unintentionally make some mistakes e.g. writing a minus sign (-) instead of (+). We cannot detect errors unless we begin entering data to the program with previously known results; and compare the results of the current program to those of the well-known results and so you can discover the errors and correct them.

Fifth: Program Documentation

This step includes writing all steps taken for solving the problem that include: given Input, output, plan for solving the problem, drawn flowchart, programming language used for coding , instructions, date of last modification of the program and, people who contribute to the program development process . This is done to have the program documented to go back for feedback and correction. This documentation is beneficial when more than one person participate in writing or modifying the program.

Dear Student

After we have learnt about the problem-solving stages and flowcharts, we will learn about some standard (agreed on symbols), Special symbols can also be used for exceptional cases.



Here are some **of the most commonly used symbols** as shown in table **(1-1)**

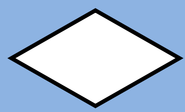
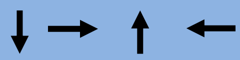
Significance	symbol
(Terminal)	
(Input/Output)	
(Process)	
(Decision)	
(Flow Lines)	

Table (1-1) Common symbols for Flowcharts

1-3 Flowchart:

1-3-1 Simple Flowcharts:

Exercise (1-1):

Draw a flowchart for a program that will calculate the sum of two numbers entered by the user and display the result.

First: Define the problem

Output: The sum of two numbers

Input: The first number is “A “and the second number is “B”

Processing (Solution): C =A+B where the result is C

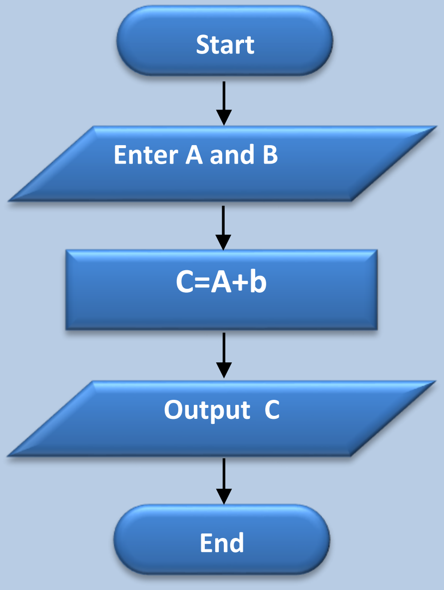
Second :Algorithm	Third :Flowchart
1 Start 2 Enter the number A and the number B 3 Performing the sum of the two numbers using this equation C=A+B, the output is C 4 Print the output C 5 End	

Table (1-2) Algorithm and Flowchart for summation of tow numbers

To construct a Flowchart we should consider the following:

1- **The flowchart should start with the Start symbol and end with the End symbol.** 

2- **A,B,C are variable names .The variable refers to a memory storage that holds a value.**

3-**The equation: C =A+B, indicates the sum of the value of A, to the value of B, and stores the result in C.**

4-**Entering values in A and B is done by using the term “Enter”, inside a parallelogram,**  **<u>you can also use another term to get the same meaning like “Read” or “Input”</u>.**

5-**The sum equation is written inside the rectangle,**  **as it represents an arithmetic operation.**

6-**The output is expressed with a parallelogram**  **using the term “Output”, we can also use another term like “Print” or "output".**

7-**Note that flow line**  **shows the order of an Algorithm.**

Exercise (1-2)

Draw a flowchart to Solve a first degree equation Y=3x+2.

First: Define the problem

Output: The value of “Y”.
Input: X.
Processing (Solution): Compute the value of “Y” from the equation Y=3x+2.

Dear Student / remember:



1. The left hand side (LHS) of any equation should contain only one variable; the value of this variable will be the (output) or the solution of the equation.
2. The right hand side (RHS) of the equation may contain abstracted values or arithmetic expressions that have one or more variables (inputs).

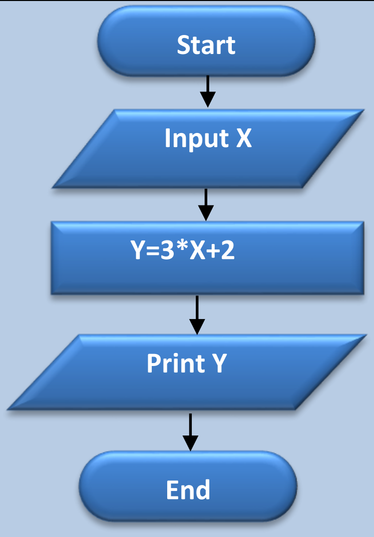
Second :Algorithm	Third :Flowchart
1 Start 2 Enter value of X 3 Calculate Y =3*X+2 4 print value of Y 5 End	

Table (1-3) Algorithm and Flowchart to solve a first degree equation

Activity (1-1)

Write down the Algorithm, and draw a flowchart to compute the area and the perimeter of a rectangle whose length (L) and width (W) are known, bearing in mind that the equation of the area is: Area =L*W and that of the Perimeter is: Perimeter =2*(L+W).

Dear Student/ Notice



The word "Area" refers to a Variable name, whose value is the calculated area of the rectangle; also "Perimeter" is a variable name whose value is the calculated perimeter of the rectangle.

Variable names are chosen to WELL indicate the content of the variables.

First: Define the problem

Output:

Input:

Solution :

Second :Algorithm	Third :Flowchart

Like the previous example, do the following activities in your notebook

Activity (1-2)

Write down the Algorithm, and draw a flowchart to calculate the area of a circle whose radius "R" is known, bearing in mind that the equation of the area of circle is: Area =3.14*R*R.

Activity (1-3)

Write down the Algorithm, and draw a flowchart to calculate the number of years, bearing in mind that the number of months is known.

1-3-2 The use of Branching (Decision) in Flowcharts

There are many problems that contain a question requires a Yes or No, or requires branching to other processes determined by flowchart.

Exercise (1-3)

Draw a flowchart to print the word "successful" in the case of the degree input is greater than or equal to 50.

First: Define the problem

Output: print the word "**successful** ".

Input: the score X.

Solution: If the value of X is greater than or equal 50; the word "**successful**" will be printed.

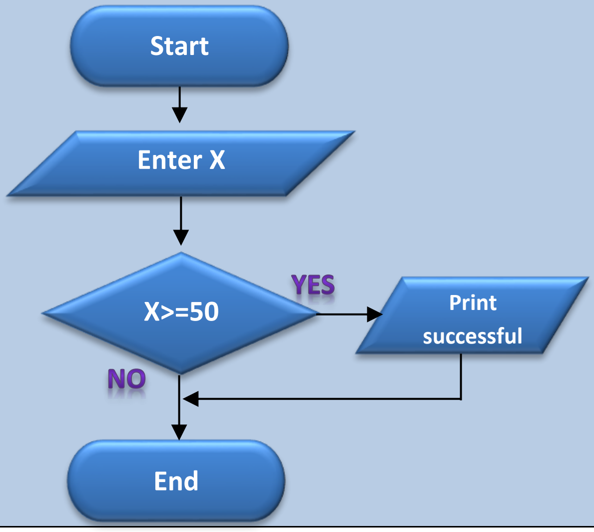
Second :Algorithm	Third :Flowchart
1 Start 2 Enter the values of X 3 If X> =50 then 3-1 Print " successful " 4 End	

Table (1-4) Algorithm and Flowchart to print the message "ناجح"

Dear Student / Notice

The execution of step (3-1) will be done only when the value of x is greater than or equal to 50 (the result of the condition is True), then it moves to step (4); otherwise when the value of x is less than 50 (the result of the condition is False), the execution is transferred to step 4 directly.



Exercise (1-4):

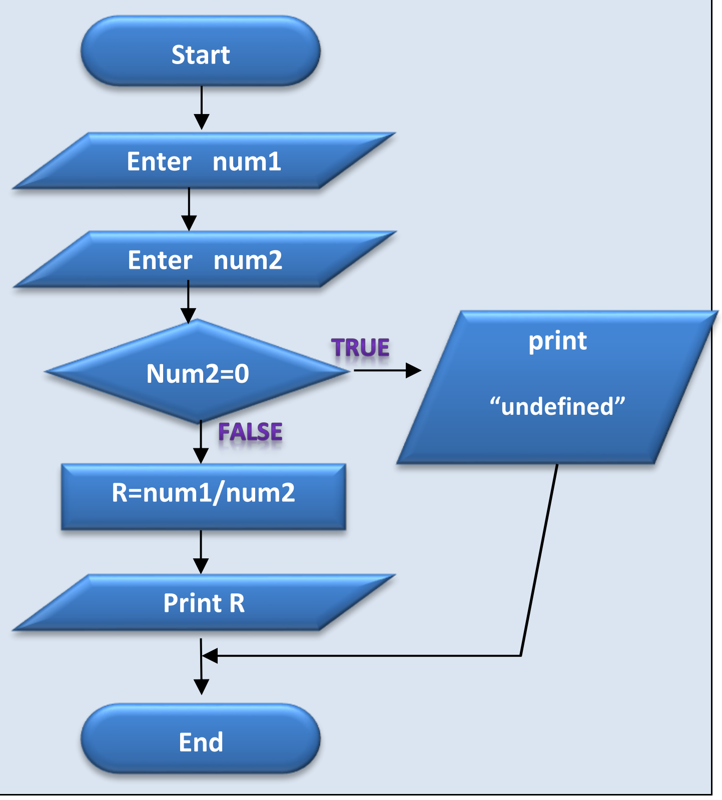
Draw a flowchart for a program that will calculate the division of two numbers. if the divisor equals (zero) , the message displays "undefined ".

First: Define the problem

Output: print the result of dividing two numbers "R" or print the word "**undefined**"

Input: Numerator is "num1", denominator is "num2".

Solution: if num2=0 then print "**undefined**", otherwise print the result of the division "R".

<table>
<tr><th>Second :Algorithm</th><th>Third :Flowchart</th></tr>
<tr><td>
1 Start
2 Enter the Numerator num1
3 Enter the denominator num2
4 If num2 =0 then
4-1 Print "undefined"
4-2 Go to step 7
5 R=num1/num2
6 Print R
7 End
</td><td>


</td></tr>
</table>

Table (1-5) Algorithm and Flowchart to print the division of two numbers

Dear Student / Notice

1. Step (4) is a decision (represented by the rhombus shape) It is a comparison that evaluates this question (is num2=0?) If the result is Yes then the word "undefined" will be printed according to mathematical rules; then the execution will be transferred to step (7) to end the program and prevent the execution of the division.
2. If the result of the condition in (step 4) is false, the execution will be transferred to step (5) directly because step (4-1) and (4-2) won't be executed.



Exercise (1-5)

Draw a flowchart for a program that obtains a number from the user. Determine the number type (even or odd) and print the result

First: Define the problem

Output: print the number type (even or odd).

Input: the number “N”.

Solution: the even number is determined if the entered number is divisible by 2 without remainder, otherwise it will be odd.

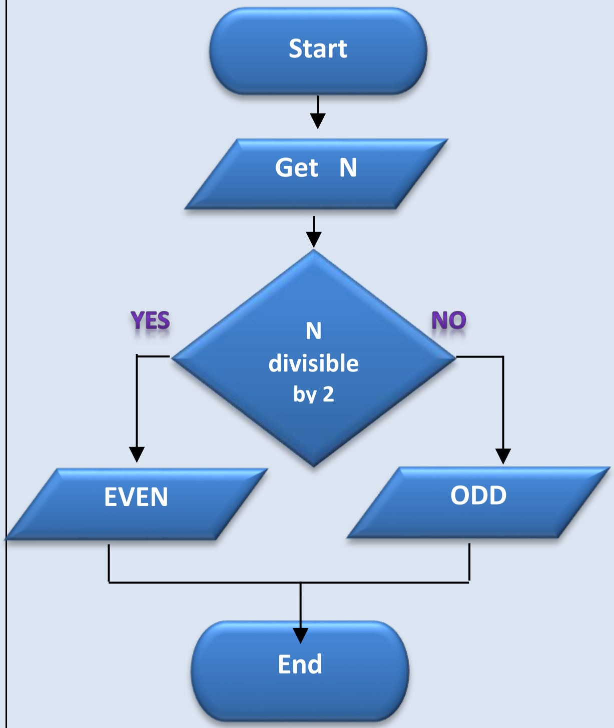
Second :Algorithm	Third :Flowchart
1 Start 2 Enter N 3 If N is divisible by 2 without remainder then 3-1 Print “even number” 4 Else 4-1 Print “**odd number**” 5 End	

Table (1-6) Algorithm and Flowchart to enter a number and print its type (odd or even)

Exercise (1-6)

Draw a flowchart to Get a temperature degree, and print out the following results “greater than zero” – “less than zero “or “equal zero”.

First: Define the problem

Output: print out “greater than zero” – “less than zero “or “equal zero”.

Input: temperature degree Celsius “D”.

Solution: the temperature degree entered will be compared to zero.

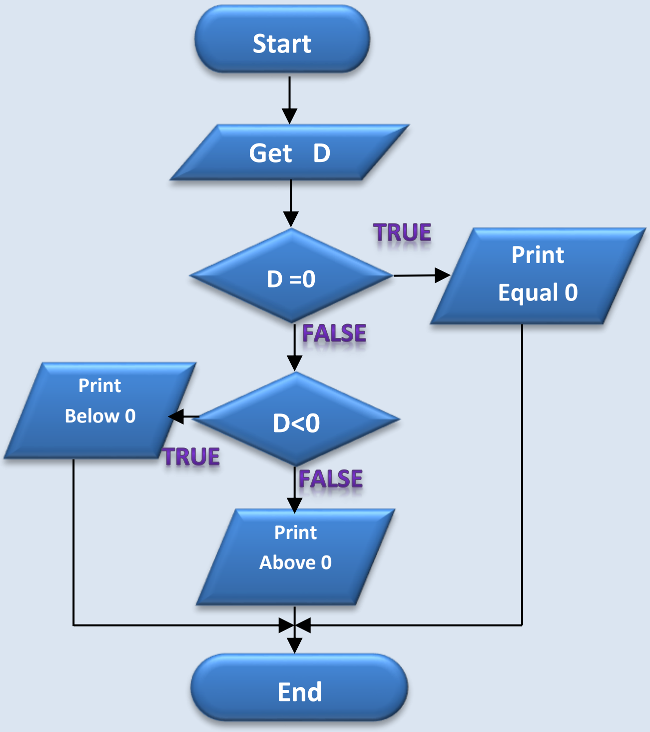
Second :Algorithm	Third :Flowchart
1 Start 2 Enter D (temperature degree) 3 If D=o then 3-1 Print "Equal zero" 4 Else 4-1 if D<0 then 4-1-1 Print "Below zero" 4-2 Else 4-2-1 Print "Above zero" 5 End	

Table (1-7) Algorithm and Flowchart to get the temperature

Activity (1-4)

Write down the Algorithm, and draw a flowchart to enter two unequal numbers, then Print "the largest is …? "and, "the smallest number is…? ".

First: Define the problem

Output: print out "the largest number is ...? "– "the smaller number is ….? "

Input: X, Y so x not equal y

Solution: ………………..

Second :Algorithm	Third :Flowchart

Activity (1-5)

The following flowchart is used to calculate the Area of a circle with radius “R”. Redraw the Flowchart so that it displays the message “not allowed “and exits from the program (When the value of “R” is negative).

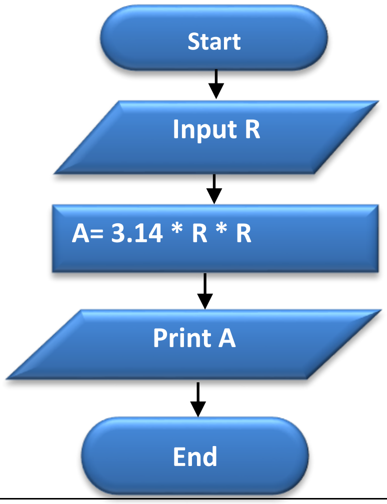
Flowchart	Modified Flowchart
	

Table (1-8) Flowchart to calculate the area of a circle

1-3-3 The use of iterative Loops in Flowcharts:

Exercise (1-7)

Print out the numbers from 1 to 3.

First: Define the problem

Output: print numbers from 1 to 3

Input: number M

Solution: print number M and increment it by 1 then continue printing until the value of M become greater than 3

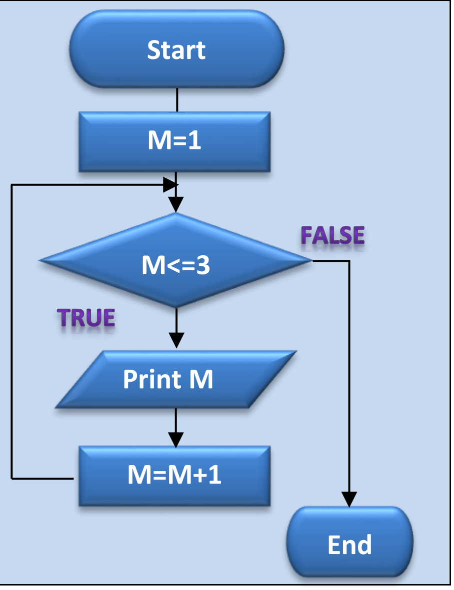
Second :Algorithm	Third :Flowchart
1 Start 2 M=1 3 If M<=3 then 3-1 Print M 3-2 M=M+1 3-3 Go To step(3) 4 End	

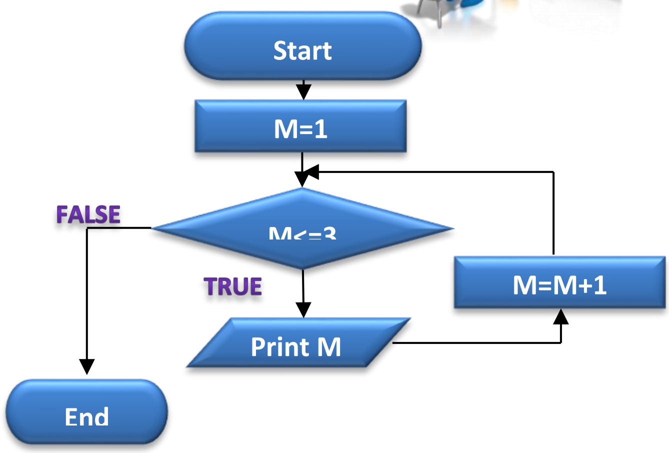
Table (1-9) Algorithm and Flowchart to print the numbers from 1 to 3

Dear Student / Notice

As long as the value of M does not exceed 3, the program prints value of M. When M becomes 4 ;(M=4) the program goes to step (4).



The opposite figure is the same flowchart drawn above but in a different way, this means that what really matters is the sequence of solution steps not the flowchart figure.



You can track the progress of the solution steps and follow each step of the code as shown in table (1-10).

	Step	value of M	Result
	1-Start	There is No variable	
	2-M=1	1	
	3-If M<=3 (True)	1	
1	3-1 Print M	1	1
	3-2 M=M+1	2	
	3-3 Go to step (3)	2	
	3-If M<=3 (True)	2	
2	3-1 Print M	2	2
	3-2 M=M+1	3	
	3-3 Go to step (3)	3	
	3-If M<=3 (True)	3	
3	3-1 Print M	3	3
	3-2 M=M+1	4	
	3-3 Go to step (3)	4	
	3-If M<=3 (False)	4	
	4-End	4	

Table (1-10) Tracking the variables and the corresponding result of exercise (1-7)

How many times was the content of the loop executed? ……………………
What will be the value of M after the end of the loop? ……………………………

Dear Student / Notice



1-When the value of M equals 4, the condition becomes (False).

2-We conclude that the number of repetition in the loop is pre known in this exercise.

3- The variable M is called a counter; as it causes the steps (3-1) and (3-2) and (3-3) to be repeated for a definite number of times (3 times).

Exercise (1-8)

Modify the Flowchart of the previous exercise to print the multiplication table of Number 3 as illustrated in table (1-11)

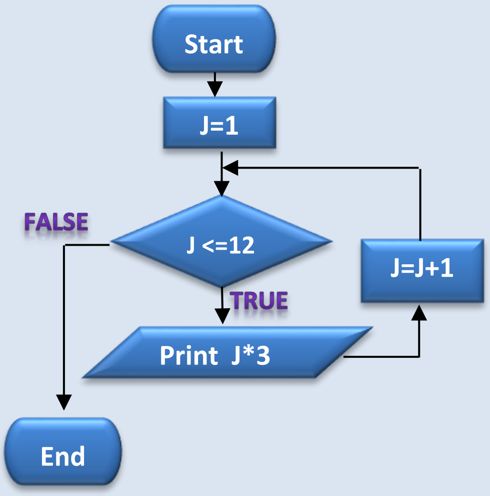
<table>
<tr><th>Algorithm</th><th>Flowchart</th></tr>
<tr><td>1 Start
2 J=1
3 If J <=12 then
3-1 Print J*3
3-2 J=J+1
3-3 Go To step(3)
4 End</td><td>
</td></tr>
</table>

Table (1-11) Algorithm and Flowchart to print the multiplication table of No 3.

Compare this flowchart to the one in the previous exercise (what are the differences?).

Activity (1-6)

Track the values of the variable (J), and the printed value on executing every step in the previous exercise (write down in your notebook).
What is the value of J after the end of the loop.

Make the necessary modifications to the Flowchart of the previous exercise, so that you can enter the required multiplication table constantly instead of printing the multiplication table of "3".

Algorithm	Flowchart
1 Start 2 Enter N 3 J=1 4 If J<=12 then 4-1 Print J*N 4-2 J=J+1 4-3 Go To step(4) 5 End	

Table (1-12) Algorithm to print the multiplication table of an entered number

Activity (1-7)

Write down the Algorithm, and draw a flowchart to print out even numbers from 1 to 10.

:Algorithm	Flowchart

Exercise (1-9)

Print out the sum of integer numbers from 1 to 3.

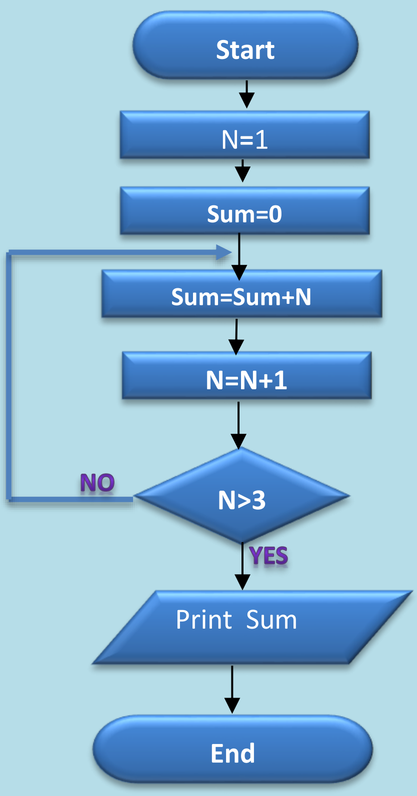
Algorithm	Flowchart
1 Start 2 N=1 3 Sum=0 4 Sum =Sum + N 5 N=N+1 6 If N>3 Then 6-1 Print Sum 7 Else 7-1 Go to step (4) 8 End	

Table (1-13) Algorithm and flowchart to print the sum of integer numbers from 1 to 3

You can track the values of variables as shown in table (1-14)

Step	Value of N	Value of Sum	Result
1-Start	No variable	No variable	
2-N=1	1	No variable	
3-Sum=0	1	0	
4-Sum=Sum+N	1	1	
5-N=N+1	2	1	
6-if N>3 (False)	2	1	
7-1 Go To step (4)	2	1	
4-Sum=Sum+N	2	3	
5-N=N+1	3	3	
6-if N>3 (False)	3	3	
7-1 Go To step (4)	3	3	
4-Sum=Sum+N	3	6	
5-N=N+1	4	6	
6-if N>3 (True)	4	6	
6-1 Print Sum	4	6	6

Table (1-14) tracking the values of variables and corresponding results of exercise (1-9)

Dear Student / Notice

Variable N is considered a Counter, while variable Sum is used for accumulation process.



Activity (1-8)

Redraw the Flowchart of the previous exercise in your notebook after modifying it to print out the sum of odd numbers from 1 to 10.

Activity (1-9)

After executing the previous activity, draw the flowchart in your notebook to print out the sum of even numbers instead of the odd ones.

Questions

First: <u>Put (✓) in front of the correct sentence and (X) in front of the wrong one:</u>

(1)	**Flowcharts use standard symbols and lines to represent a problem algorithm.**	( )
(2)	**You can use any Geometric shape to represent Algorithm when drawing flowcharts.**	( )
(3)	**The symbol  is used to represent start and end of flowchart.**	( )
(4)	**The rectangle symbol  is used to represent the data input operation.**	( )
(5)	**The symbol  is used to represent a decision process in flowcharts.**	( )
(6)	**The problem means that an objective or output is required to reach.**	( )
(7)	**Preparing a cup of tea is an example of a problem.**	( )
(8)	**Problem solving is the steps, activities, and processes to be done to reach an output or objective.**	( )
(9)	**The program documentation is a set of procedures arranged logically for solving a specific problem.**	( )
(10)	**The program testing is writing down all the steps taken to solve a problem.**	( )
(11)	**Documenting the program means making sure that the program is free of errors.**	( )
(12)	**Algorithm is a set of procedures arranged logically for solving a specific problem.**	( )
(13)	**The program documentation is writing down all the steps taken to solve a problem.**	( )
(14)	**Testing the program means making sure that the program is free of errors.**	( )
(15)	**Flowcharts are diagram representations which depend on drawing some standard symbols to clarify the order of procedures to solve a problem.**	( )
(16)	**Flowcharts help to facilitate understanding of the problem, analyse and convert it to a program.**	( )

Second: Choose the appropriate answer to complete each phrase of the following:

1- **Steps, activities and procedures to be done to reach an objective or an output - can be called:**
   a. problem definition   b. problem   c. problem solving

2- **On drawing flowcharts we use:**
   a. standard symbols and lines   b. all geometric figures   c. one geometric figure

3- **A set of procedures arranged logically for solving a specific problem – can be called:**
   a. problem   b. algorithm   c. program testing

4- **Making sure that the program is free of errors – can be called:**
   a. program testing   b. program documentation   c. algorithm

5- **Writing down all the steps taken to solve a problem errors – can be called:**
   a. program documentation   b. program testing   c. flowcharts

6- **Problem-solving includes many terminologies, the terminology that expresses the preparation of a cup juice is:**

a. Flowchart　　b. algorithm　　c. problem

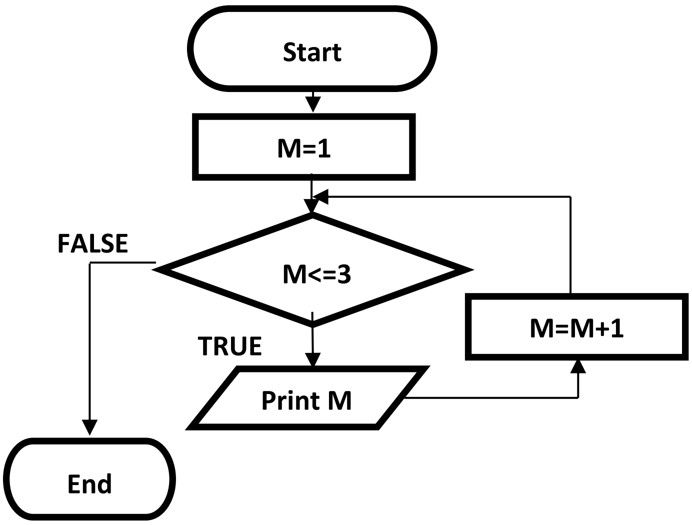
7- **Problem-solving approach includes many of the terminologies, the terminology that expresses the mathematical problem is:**

a. Algorithm　　b. problem　　c. program design

8- **A diagramatic representation that depends on drawing some standard symbols to clarify the order of procedures to solve a problem can be called:**

a. Problem　　b. algorithm　　c. flowchart

9- **In the following flowchart:**



The number of iterations (print the value of M) is:

a- 2　　b- 3　　c- 4

10-**In Flowchart of the previous question, the value of M after the end of the iterative loop equals**:

a. 2　　b- 3　　c- 4

Chapter: 2

Introduction to Visual Basic.net

By the end of this chapter, the student will be able to:

- Explain what is meant by programming language
- Identify the essence of Visual Basic.net
- Identify the main components of IDE screen
- Identify what Framework.Net can provide

INTRODUCTION

In the previous chapter, you have studied the logical steps of solving a problem. In this chapter, you will deal with Visual Basic.net program which will enable you to convert the steps of solving a problem into programme codes that can be carried out.

2-1 The language of Visual Basic.net

It is one of the high level programming languages and designed to be easy to learn as its commands and instructions use English language vocabulary and it can be used in many applications such as:

1- Windows applications

2- Web applications

2-2 Programming and Computer memory

Commands and instructions which are written in Visual Basic.net enable you to create objects in computer memory and every object has:

1- Properties such as (size-colour- font) of the text written on the program interface.
2- Events such as click on a command button.
3- Procedures, each one contains commands and instructions which are carried out when calling this procedure.

So, the Visual Basic.net is considered:

Object oriented as its programmes work through objects in computer Memory.

Event Driven as commands and instructions are carried out as soon as certain event occurs.

2-3 The language of Visual Basic.net and Framework.net:

The Framework.Net provides the following:

* Libraries through which we create the objects,

* Runtime environment (called **Runtime)** in computer memory where Applications produced by the language of Visual Basic.net language work in.

* Compilers which compile commands and instructions written in Programming language into machine code which the Computer deals with.

2-4 Visual Basic.net and IDE:

The programmer of Visual Basic.net needs **I**ntegrated **D**evelopment **E**nvironment (IDE) which provides tools and merits to the programmer that help him create applications (windows – mobile – web…..). Visual Studio represents IDE as shown in figure (2-1):

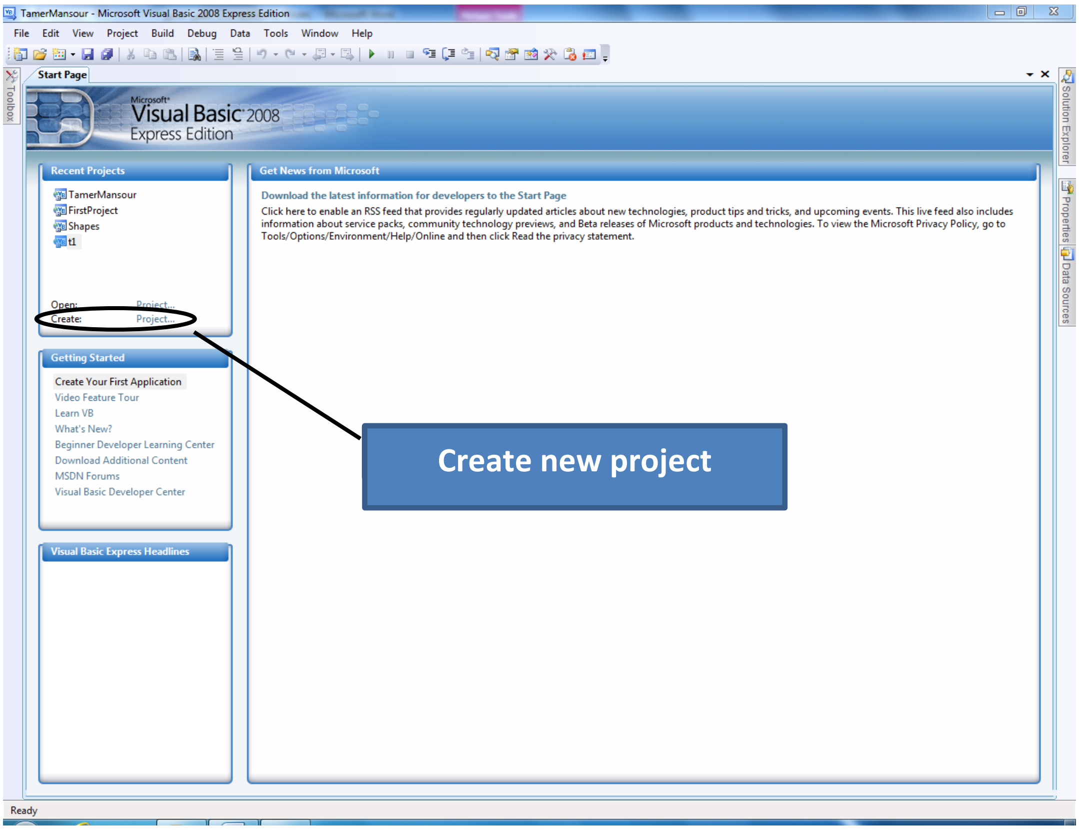


Figure (2-1) IDE window

When the programmer creates a new project, it appears as in figure (2-2)

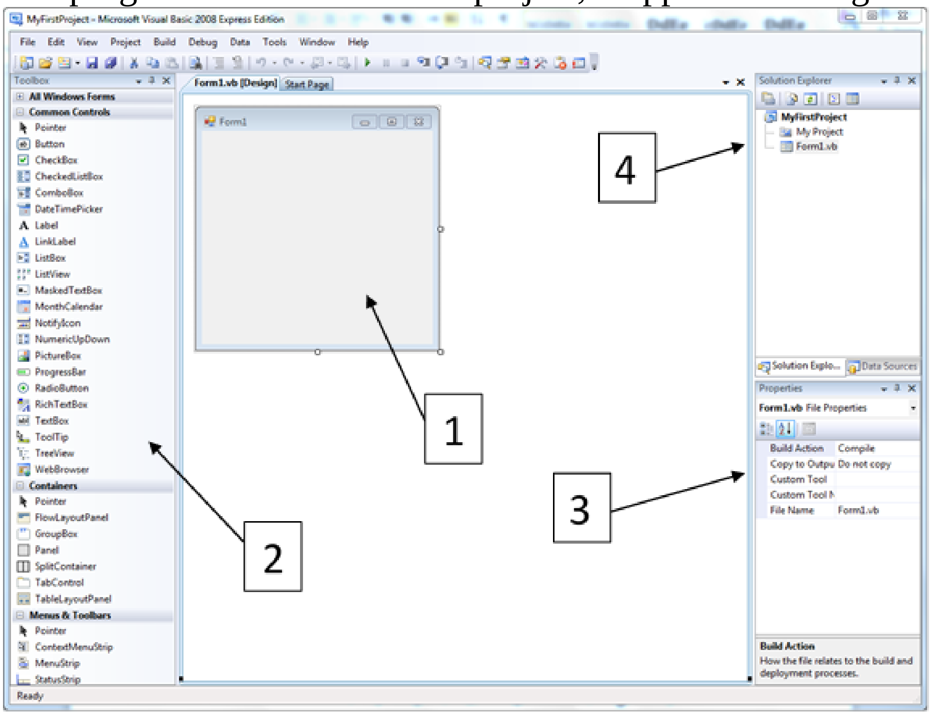


Figure (2-2) (IDE) screen for new project

Numbers shown in figure (2-2) refer to some components of Integrated Development Environment IDE

1- Form Window
2- Toolbox Window
3- Properties Window
4- Solution Explorer

2-4-1 Form

The form is the interface which the user deals with through different controls such as Button, Textbox, label……etc. as shown in figure (2-3)

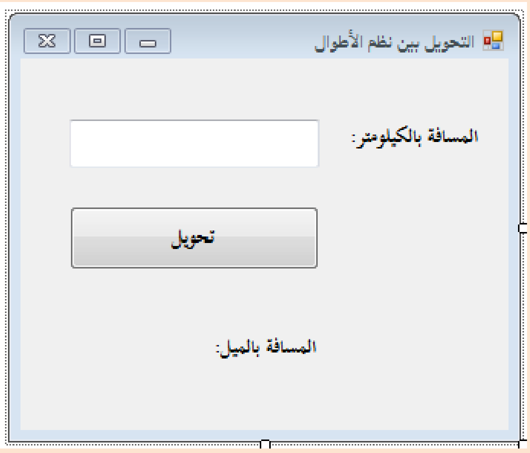
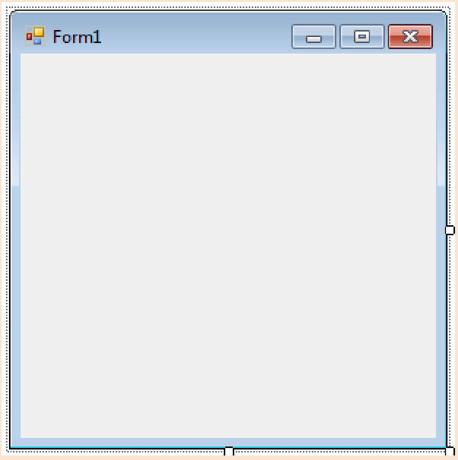
Form window after putting controls	Form window before putting controls
	

Figure (2-3) form window before and after putting controls

2-4-2 Toolbox

It contains tools of controls which can be put on the Form and can be shown in categories as in Figure (2-4)

Notice that there is (+) sign beside every category and when you click it, a group of tools controls appear and you can show all tools of controls by choosing the category (All Windows Forms)

Some of these categories include:

*Common Controls

*Menus & Toolbars

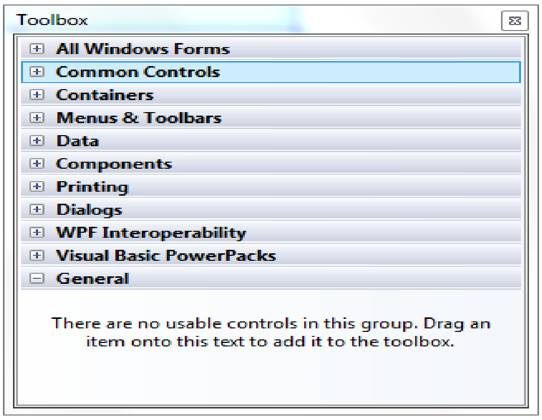


Figure (2-4) (Toolbox)

There is a group of control Tools under each category as shown in figure (2-5)

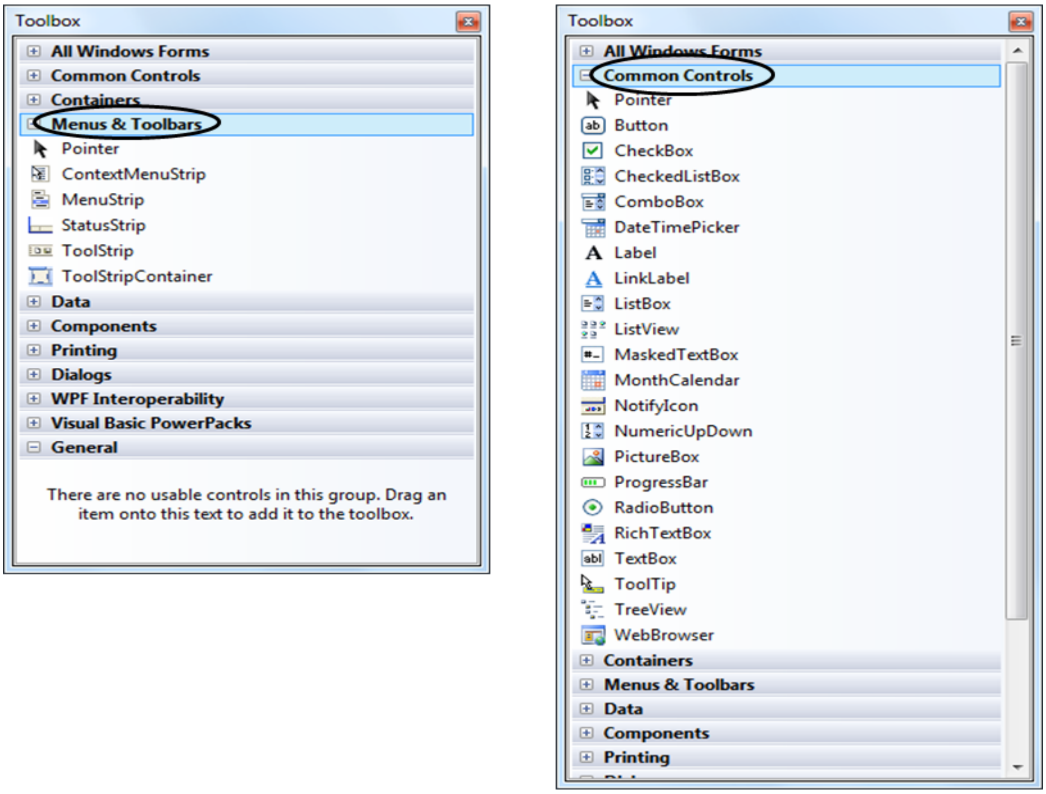


Figure (2-5) controls under various categories

<u>Some Common Controls</u>

Button	TextBox	Label	ListBox
ComboBox	CheckBox	RadioButton	

Table (1-1) Some common Controls

2-4-3 Properties Window:

Each tool of the above Common Controls has a group of properties which can be adjusted through "Properties Window" as shown in Figure (2-6)

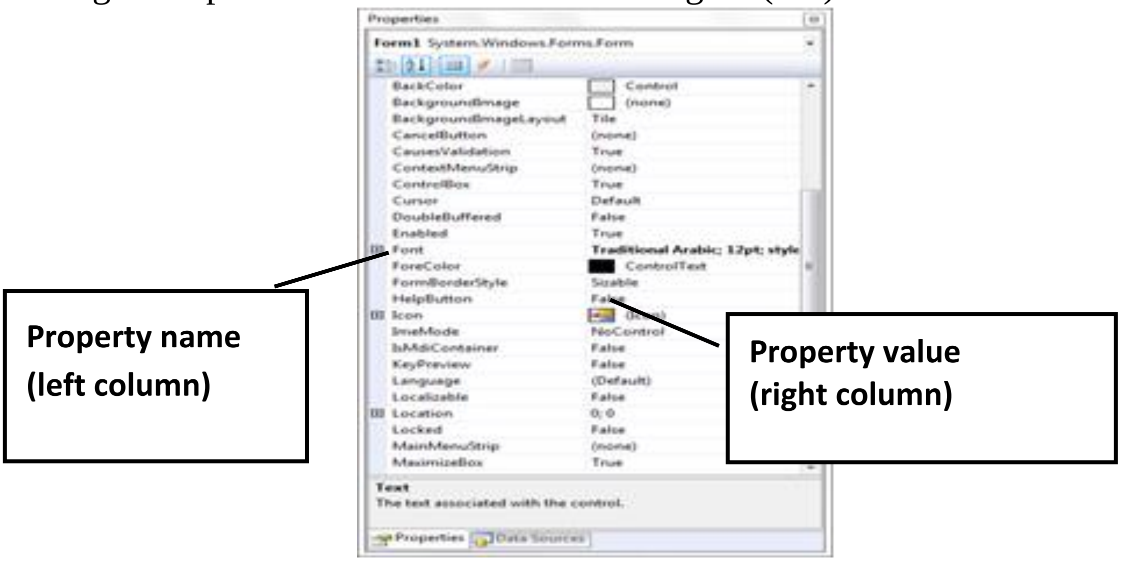


Figure (2-6) Properties Window

DEAR STUDENT / NOTICE

The shown Properties in Properties Window are different according to the active part on the IDE screen.

2-4-4 Solution Explorer

There is a list of folders and files of the projects in this part as shown in Figure (2-7)

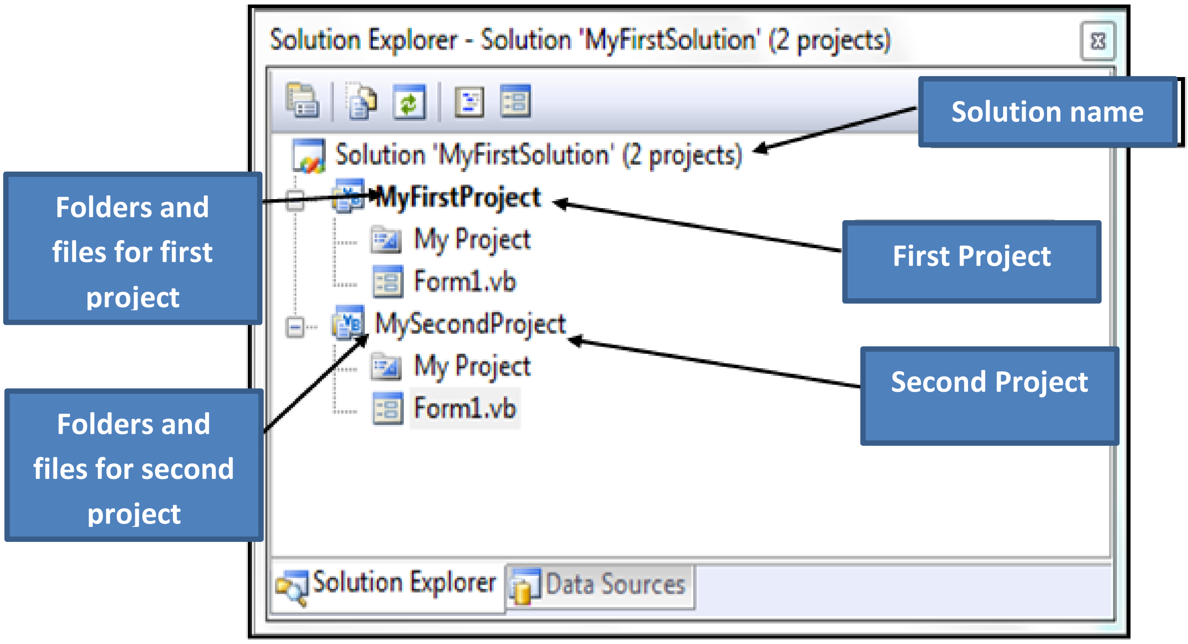


Figure (2-7) Solution Explorer window

Activity (2-1):

With the help of your teacher create a project with the name " MyFirstProject " and the solution name is " MyFirstSolution " and then add another project to the solution with the name " MySecondProject "

Questions

First: Put (✓) in front of the correct sentence and (X) in front of the wrong one:

N	Question	Answer
1-	The VB.net language is one of the high level languages.	( )
2-	The VB.net language is one of Event Driven languages.	( )
3-	The VB.net language is the only high level language.	( )
4-	The VB.net language is considered a high level language because it is easy to learn.	( )
5-	The VB.net language is used in producing Windows applications and Web applications.	( )
6-	The VB.net language is used in producing Web applications only.	( )
7-	The VB.net language can't be used in producing Windows applications	( )
8-	Every Object is characterized by certain properties and certain behaviour when a certain event occurs on it.	( )
9-	Events and procedures which belong to any object in VB.net language are called properties.	( )
10-	The name, the size and colour of an object are all samples of events that can occur to the object in VB.net language.	( )
11-	The name, the size and colour of an object are all samples of properties of some objects in VB.net language.	( )
12-	The Events are the commands and instructions which are carried out when a certain procedure occurs to the object in VB.net language.	( )
13-	The procedures are the commands and instructions which are carried out when a certain procedure occurs to the object in VB.net language.	( )
14-	Pressing click and D-click are samples of some events that can occur to an object in VB.net language.	( )
15-	Framework.net contains Compilers, libraries and runtime environment	( )
16-	Compilers in Framework. Net are considered the environment of runtime for applications which are produced in VB.net language.	( )
17-	Compilers are programmes that translate commands and instructions written by the programmer from the high level language into machine language.	( )
18-	Object Oriented Programming Languages are the languages that work through objects in memory.	( )
19-	All programming languages which carry out a group of commands and instructions are considered as Event Driven languages.	( )
20-	Visual Studio is considered IDE because it includes a group of tools, elements and characteristics necessary to produce applications.	( )

Second: Choose the correct answer to complete each statement:

1-Object Oriented programming language depends on:

a- using Windows applications.
b- Using Web applications
c- Objects in computer memory.

2-You can produce Windows applications or Web applications by using:

a- Objects in computer memory
b- VB.net language
c- Properties and Events

3- Characteristics which describe the object such as size, name and colour are called:

a- Properties
b- procedures
c- Events

4-Click on Button is:

a- property
b- procedure
c- Event

5-Commands and instructions which we want to carry out are called:

A -properties
B -producers
c - Events

6- The Properties term refers to:

a- Features that describe the object.
c- Events that can occur to the object.
c- Commands and instructions that are carried out.

7-The Events term refers to:

a- properties that describe the object.
b- Events that can occur to the object.
c- Commands and instructions that are carried out.

8-The Procedures term refers to:

a- properties that describe the object.
b- Events that can occur to the object.
c- Commands and instructions that are carried out.

9-libraries, Compilers and Environment of runtime of applications are the most important components of:

a- Object Oriented.
b- Event Driven.
c- Framework.net.

10- IDE is called:

a- Visual Basic.net
b- Visual Studio.
c- Framwork.net.

Chapter Three

Controls

By the end of this chapter, student will be able to:

- Recognize the Properties Window.
- Choose the appropriate Property.
- Choose the proper value for the Property.
- Differentiate between controls Properties.

3-1 Form

The Form has many properties which share in defining the form of program screen we want to create. Here are some properties of the Form:

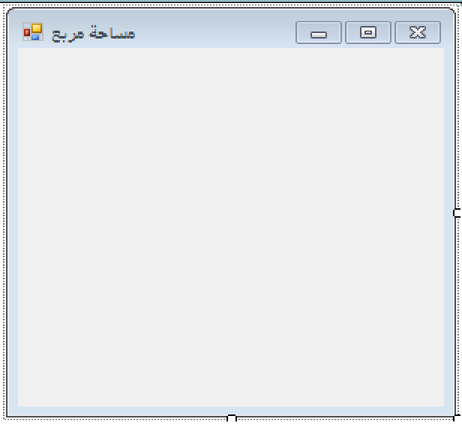
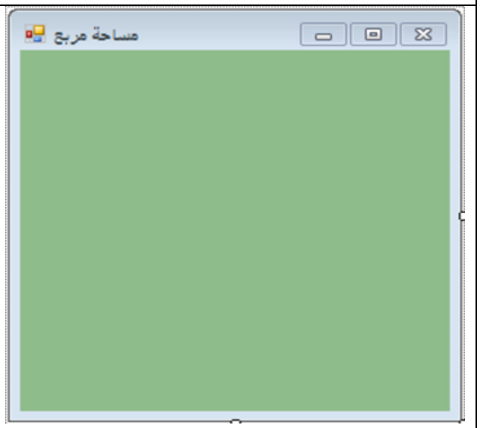
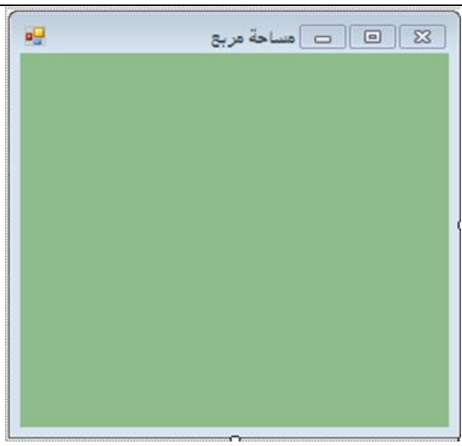
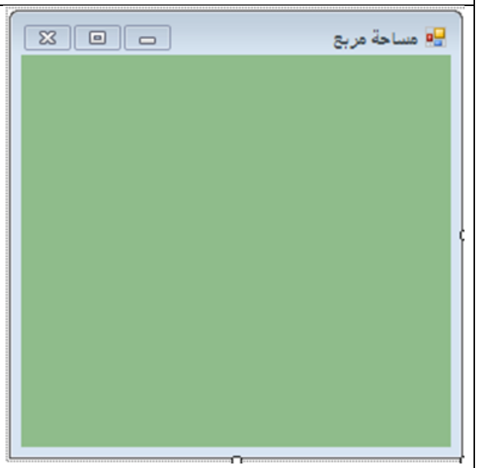
N	Property name	Function
1	Name	Name of Form used in Code Window.
2	Text	The appeared Text on the title bar of the Window.
3	Backcolor	The background color of the Form.
4	Right to Left	The direction of Controls on the form Window From Right to Left.
5	Right to Left layout	The layout of Controls on the Form from right to left.
6	MinimizeBox	It controls the appearance or disappearance of MinimizeBox of Form Window.
7	MaximizeBox	It controls the appearance or disappearance of MaximizeBox of Form Window.
8	ControlBox	It controls the appearance or disappearance of ControlBox of Form Window.
9	FormBorderStyle	The Border style of Form Window.
10	WindowState	It defines the Window State of the Form (Maximizing, Minimizing or normal).

Activity (3-1)

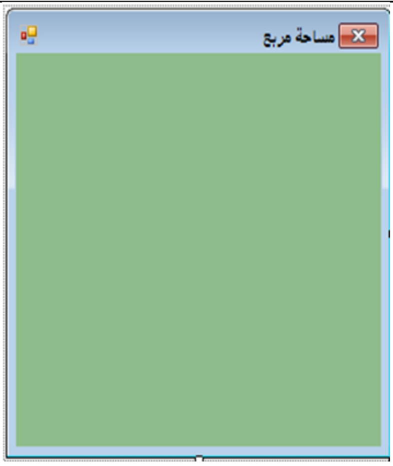
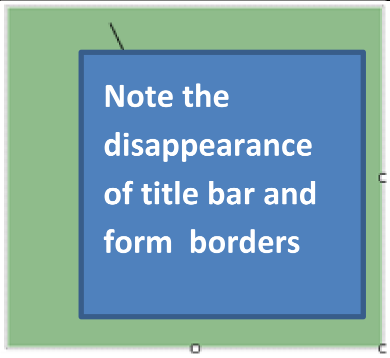
Set the following properties of the Form on your computer:

Here are the effects of setting the previous properties on the Form:

property	Value	Appearance mode of property effect	Form Window after setting the property
Name	**frmSquare**	In design mode	The value of Name property doesn't appear on the Form because it is used as Form name in code window.

Text	مساحة المربع	In design mode and runtime mode	
BackColor	**DarkSeaGreen**	In design mode and runtime mode	
RightToLeft	**Yes**	In design mode and runtime mode	
RightToLeftLayout	**True**	In design mode and runtime mode	

The following is the effect of setting the value of the previous properties of the form :

property	value	Appearance mode of property effect	Form Window after setting the property
MaximizeBox MinimizeBox	False False	In design mode and runtime mode	
ControlBox	False	In design mode and runtime mode	
FormBorderStyle	None	In design mode and runtime mode	
WindowState	Maximized	In runtime mode	The form is Full screen

Notes:

- There are common properties among different Controls such as (Name-Text – Forecolor – Backcolor - Right To Left…….etc.)
- There are some properties which their effect doesn't appear on Controls until you set some other properties , for example the Right to Left Layout property doesn't work unless the value Right to Left equals Yes.
- There are properties of the form, if they are set, they are applied to Controls which are placed on this Form such as font and **ForeColor** properties.
- The default value of the property (Text) and the property (Name) is the same and it is (Form1).
- When you set some properties, the effect of setting appears directly on the Form in design mode of the programme.
- There are some properties which their effect doesn't appear on the Form or Controls until you run the programme.
- The other Controls may have the same properties mentioned above, so they won't be repeated again When we studying these other controls once more.
- We will study the distinctive properties of each tool as follow:

3-2 Button

It is one of Controls which can be placed on the Form. When you click it, it does a certain task.

3-2-1 placing the Button on the form.

By double clicking on the Button control on Toolbox, the Button appears on the Form in Design mode as it is shown in Figures (3-1) and (3-2)

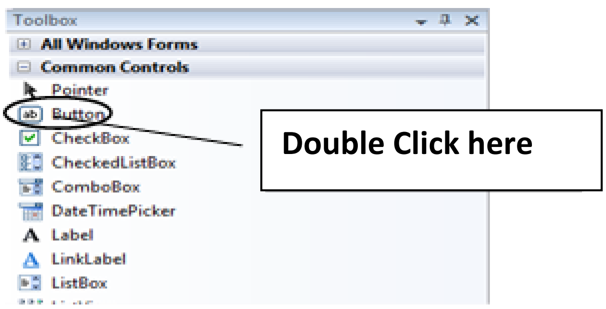


Figure (3-1) Button in Toolbox

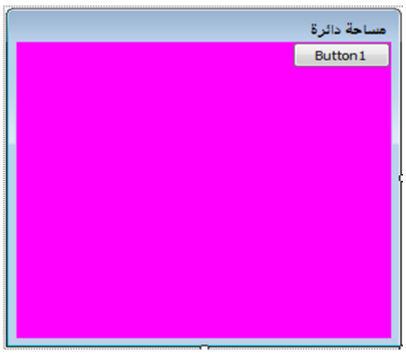


Figure (3-2) the shape of Button after drawing it

Some distinctive properties of Command Button:

N	Property	Function
1	Location	The location of placing Button on the Form.
2	Size	Defining the height and width of Button on the Form.
3	Text	The appeared Text on the Button
4	BackColor	Choosing the backColor of the Button.
5	Font	Defining (shape, size and style) of the Text font appeared on the Button.
6	ForeColor	Choosing the ForeColor to the appeared Text on the Button

Note that when you click on the command button in the design mode:

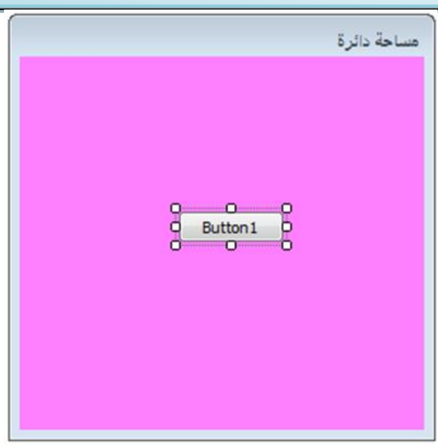
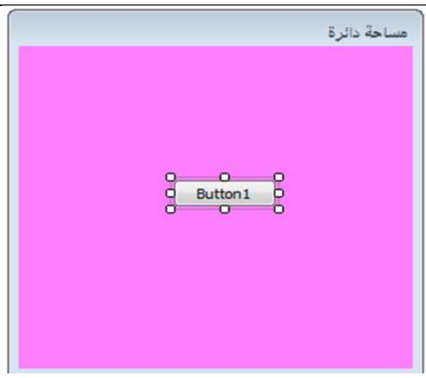
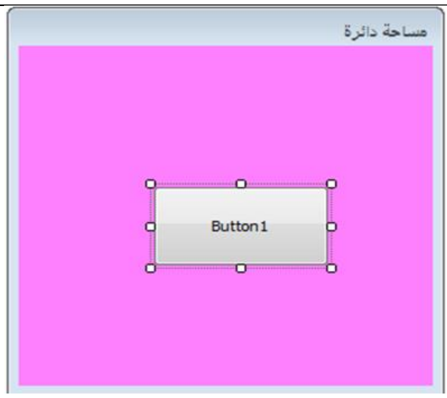
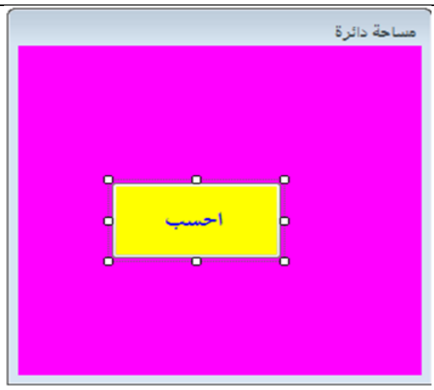
- Eight squares appear on the borders of the Button.
- You can change the size of the Button by using the process of drag and drop using the pointer of the mouse through the eight squares.
- You can change the location of Button by using the process of drag and drop after moving the mouse pointer until it turns into a shape with four heads.

Activity (3-2)

Set the following properties on your computer:

Here are the effects of setting the previous properties on the Button:

property	Value	Appeared effect of property	Form Window after setting the property
location	0,0	In design mode and runtime mode	

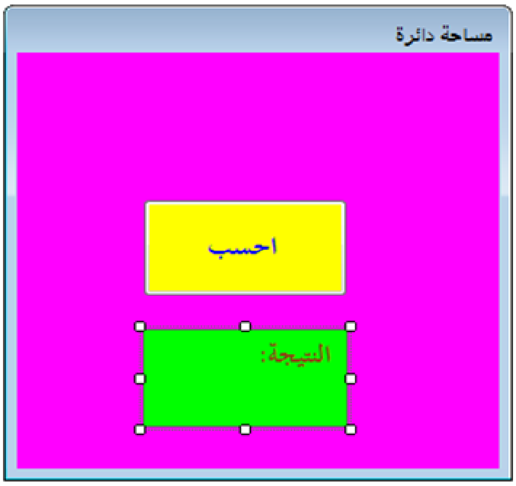
location	98,108	In design mode and runtime mode	
Size	75,23	In design mode and runtime mode	
Size	121,62	In design mode and runtime mode	
Backcolor Forecolor Text	Yellow Blue احسب	In design mode and runtime mode	

3-3 Label

It is a tool used in showing a Text on the Form Window which can't be changed during programme Runtime.
Some distinctive properties of the Label:

N	Property	Function
1	AutoSize	The Size of the Label is defined automatically according to the written Text if the Value of property equals true.
2	BorderStyle	Choosing the Border Style of the Label

Here are the effects of setting the previous properties on the Label tool:

<table>
<tr><th>property</th><th>Its Value</th><th>The effect of property appears</th><th>The Form window after setting the property</th></tr>
<tr><td>Name</td><td>lblResult</td><td>In design mode</td><td rowspan="8">
</td></tr>
<tr><td>Text</td><td>النتيجة:</td><td rowspan="7">In design mode and runtime mode</td></tr>
<tr><td>Forecolor</td><td>Choosing an appropriate color</td></tr>
<tr><td>Backcolor</td><td>Choosing an appropriate color</td></tr>
<tr><td>Font</td><td>Choosing the Size, Style and Type of the appropriate Font</td></tr>
<tr><td>AutoSize</td><td>False</td></tr>
<tr><td>BorderStyle</td><td>FixedSingle</td></tr>
</table>

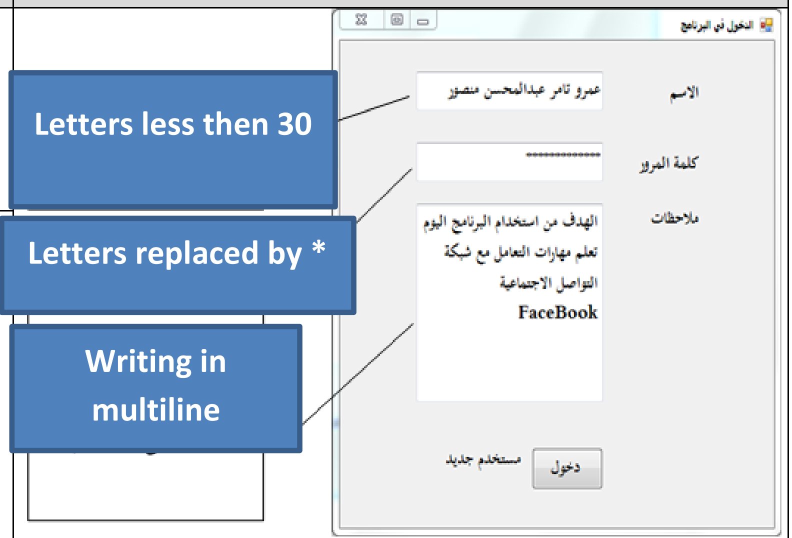
Notice: You can change the size of Label manually by using the process of drag and drop when the Value of the property AutoSize is false through the eight handles in design mode only and its effect appears in design mode and runtime mode.

3-4 TextBox

It is a tool used to insert (input) data from the user during programme run time.
Some distinctive properties of the Textbox:

N	property	Function
1	Maxlength	It defines the maximum number of letters which can be inserted in the TextBox
2	PasswordChar	It defines a symbol used instead of written text in case we have a password.
3	Multiline	allows multiple lines within the text box control tool.

Here are the effects of setting some properties on TextBox :

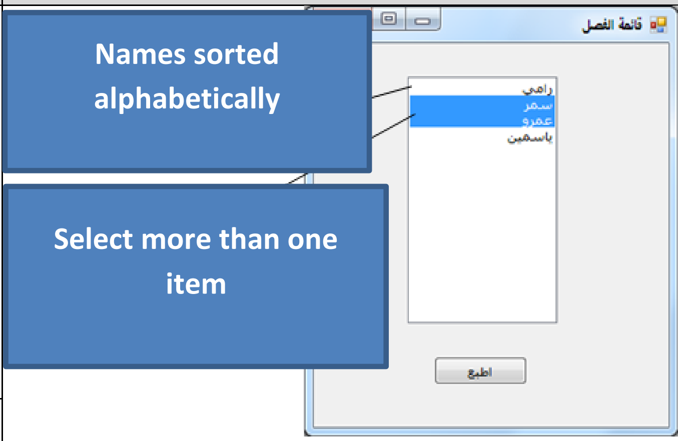
Property	value	The effect of property appears	Window Form after setting the property
Maxlength	30	In runtime mode.	
Password Char	*	In design mode and runtime mode after set a value to the text property	
Multiline	True		

3-5 ListBox:

Shows a list of items
Some distinctive properties of ListBox:

N	Property	Function
1-	Items	A group of items shown in the ListBox
2-	Sorted	It defines whether the elements in the list are sorted or not.
3-	selectionMode	It defines whether it is possible to choose one item or more shown in the ListBox.

Here is the effect of setting some properties on the ListBox :

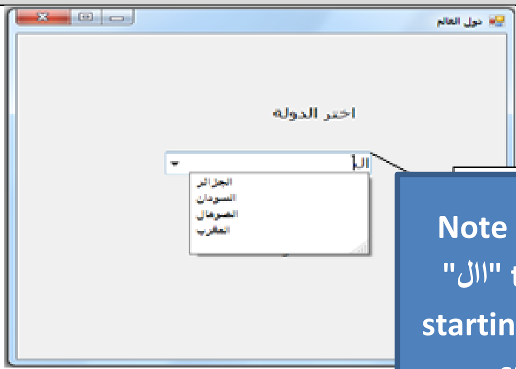
Property	value	The effect of property appears	FormWindow after setting the property
Items	عمرو رامي ياسمين سمر	In design and runtime mode	
SelectionMode	Multiextended	In runtime mode	
Sorted	True	In design and runtime mode	

3-6 ComboBox

A ComboBox control displays a drop-down list from which one item can be selected.
Some distinctive properties of the ListBox:

N	Property	Function
1-	Items	A group of items which are shown in comboBox.
2-	AutoCompleteSource	It is a source of suggested items to select from.
3-	AutoCompleteMode	It defines the method of list completing process.

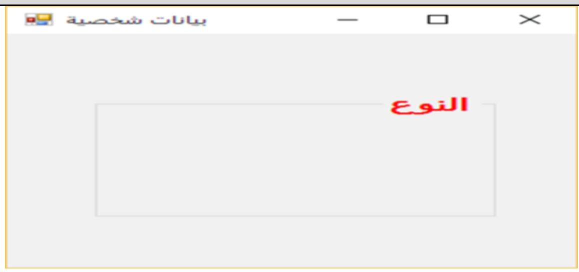
Here is the effect of setting some properties on the ListBox :

Property	value	Effect of property appears	FormWindow after setting the property
Items	مصر السودان جيبوتي اريتريا الصومال ليبيا تونس الجزائر المغرب موريتانيا **(Each country name in single line)**	In runtime mode	 Note when writing "ال" the countries starting with "ال" are suggested
AutoCompleteMode	Suggest		
AutoCompleteSource	ListItems		

3-7 GroupBox :

Is used to group other controls of same function together on the Form window

Here is the effect of setting some properties on the GroupBox:

Property	value	Effect of property appears	FormWindow after setting the property
Text	النوع	In design mode and runtime mode	
Forecolor	Choose the Red color		
RightToLeft	yes		

3-8 (RadioButton):

The programme user selects one alternative only.
Some distinctive properties of the ListBox :

N	property	Function
1-	Checked	It shows whether RadioButton has been chosen or not.
2-	Text	It is the Text shown on RadioButton

In case of placing a group of RadioButtons and set the text property to each one of them in design mode as it is shown in the following Figure (3-3)

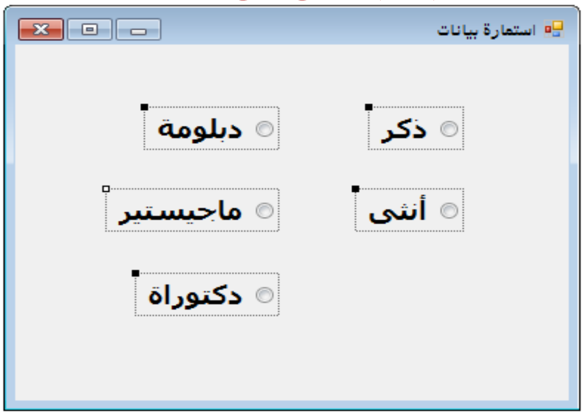


Figure (3-3) A set of RadioButton

During programme runtime , you can select one RadioButton only as it is shown in Figure (3-4)

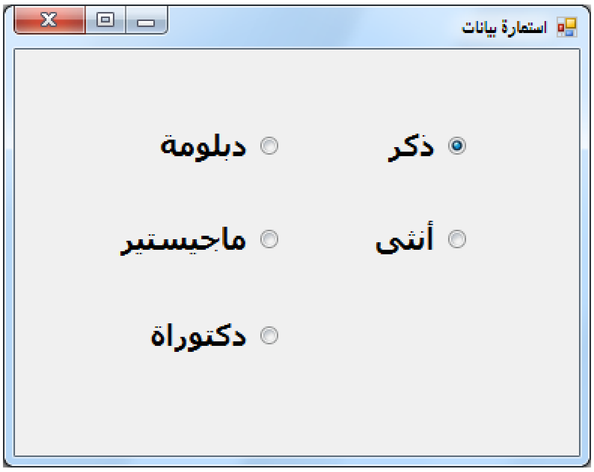


Figure (3-4) Choosing one RadioButton

You can use GroupBoxes such that each group has a title and the user is allowed to choose one alternative from each group as it is shown in Figure (3-5)

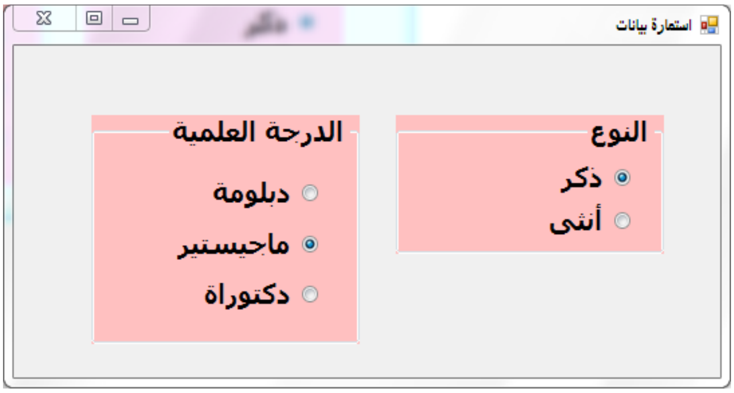


Figure (3-5) Choosing one RadioButton of each group

One RadioButton is placed inside the GroupBox by dragging the appropriate radioButton inside the GroupBox.

3-9 Checkbox

It is used for placing some alternatives to enable the user to select

One CheckBox or more as shown in Figure (3-6)

During programme runtime, you can select more than one Checkbox.

As shown in Figure (3-6)



Figure (3-6) Choosing more than one CheckBox

Questions:

First : Put (√)in front of the correct statement and(×) in front of the wrong one :-

N	Question	Answer
1	The function of the property RightToLeft of the Form is to define the direction of Controls from right to left.	( )
2	The function of the property RightToLeft of the Form is to define the state of the Form on the screen in a position of Maximizing or Minimizing.	( )
3	Setting the property ControlBox of the Form can control the Form in a position of Maximizing during programme.runtime.	( )
4	The property"Name" is used in showing a certain Text in the title bar of user window a name of the window.	( )
5	The property Text is used in showing a certain text the title bar of of user window.	( )
6	Setting some properties of the Form is applied to Controls which are placed on the Form.	( )
7	The effect of setting the WindowState property of the form appears only in runtime mode	( )
8	You can change the location of Command Button on the Form through Size property.	( )
9	You can change the location of Command Button on the Form through Location property.	( )
10	Placing Controls automatically on the Form on the co-ordinate (0-0) is in the middle of the Form.	( )
11	You can change the size of Label manually if AutoSize=true	( )
12	You can change the size of Label manually if AutoSize=false	( )
13	"Textbox control tool: is the only tool which has the property passwordChart	( )
14	"Textbox control tool: is the only tool which has the property **AutoSize**	( )
15	ListBox and ComboBox share in "Items" property.	( )
16	ListBox and and ComboBox share in " **Suggest** " property	( )
17	GroupBox is the tool used in containg a group of controls, these controls have the same function on the Form.	( )
18	ListBox is the tool used in containg a group of controls, these controls have the same function on the Form.	( )
19	CheckBox can be used on the Form to choose the Gender of student male or female.	( )
20	Combobox is the control tool that allows the user to choose one element of several elements in the smallest possible space on the form window	( )

Second: Choose the correct answer to complete each statement:-

1- The function of "Right to Left" property of the Form is:

a- define the direction of Control tools from Right to Left.
b- Define whether the layout of ControlTools on the Form is from Right to Left.
c-define the state of the window in a state of maximaizing or minimaizing.

2- ControlBox property of the Form is helping to:

a- showing or hiding of Maximaizing Box.
b- Control the appearance of the Form whether it is in a position of Minimaizing / Maximaizing / Normal.
C-Control the appearance or disappearance of ControlBox in the Form.

3-The used property in showing a certain Text on the titlebar of a Form is :
a- Name b-Text c-FormBorderStyle

4-On setting some properties of the Form, they are applied on Control Tools Which are placed on the Form (one of them is):
a-Name b-Forecolor c-Text

5-The effect of setting this property doesn't appear unless in runtime mode (This property is):
a-FormBorderStyle b-WindowState c-RightToLeft

6-The property which is responsible for the size, shape and effect of the Text font shown on the Button is :
a-Backcolor b-Forecolor c-Font

7-You can change the position of the Button on the Form through the following processes except for:
A-drag and drop by the mouse b-setting Size property c-setting Location property

8-You can change the position of the Button on the Form through:
a.setting Location property b-setting Size property c-the eight squares around the Button

9-On inserting any ControlTool by pressing D-Click from the ToolBox on the Form , the appropriate place to be shown is :
A-coordinate (0, 0)
b-the middle of the Form
c-the position of ControlTool is different according to the size of the Form

10-The size of Label is defined automatically on the Form if the property is:
a-AutoSize = False b- BorderStyle= FixedSingle c- AutoSize=True.

11-You can change the size of control "Label" manually if the property is :
a- AutoSize = False- b- BorderStyle= FixedSingle c- AutoSize=True-

12-The following properties belong to TextBox except for:
a-AutoSize b-MultiLine c-MaxLength

13-The Object TextBox is marked by one property:
a-AutoSize b-Name c-PasswordChart

14-The right value which can be used to set the PasswordChart of the TextBox is:
a-Pw b-True c-*

15-The ListBox and ComboBox share in this property:
a-Suggest b-Item c-SelectionMode

16-The ControlTool which is used in containing a group of controls that have the same function on the Form is:
a-ComboBox b-ListBox c-GroupBox

17-The Control tool which can be used on the Form to choose Gender of the student "male"or "female" is:

a-RadioButton b-CheckBox c-TextBox

18-The ControlTool which can be used on the Form and allows the user to choose more than one alternatives is :

a-RadioButton b-GroupBox c-CheckBox

19-The ControlTool which allows the user to choose one item of 15 in the smallest possible area on the Form is:

a-ComboBox b-ListBox c-RadioBox

Chapter Four

Code Window

By the end of this chapter, students will be able to:

- Work with the Code window.
- Define the Event Handler.
- Adjust Controls' Properties programmatically.

4-1 Code Window

Visual Basic.NET language provides a window through which we can write instructions and codes of the program called (code window)

To open the (Code Window) of (Form1) perform the following:

1. Make sure that the window Form is active
2. From the keyboard press (F7)

The Code window is displayed as shown in figure (4-1)

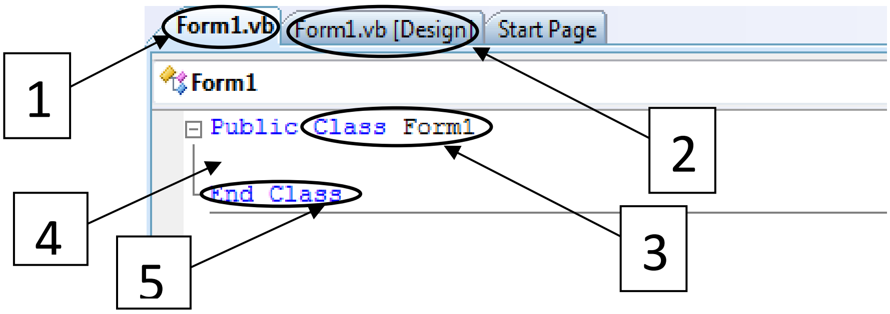


Figure (4-1) (Code Window)

The numbers shown in figure (4-1) indicate:

(1) Name of the file where codes are saved.
(2) Name of the file where the Form window interface is saved.
(3) The declaration of Class; its name is (Form1).
(4) Space between two lines; to type codes for the Class (Form1).
(5) The end of the class (form 1).

4-2 Event Handler

It's a procedure which contains a code that is carried out when a corresponding event occurs..

<u>To create event handler do the following steps:</u>

1. In the (Solution Explorer) window, right click the file (Form1.vb) and, select (View Code) from the context menu as shown in figure (4-2).

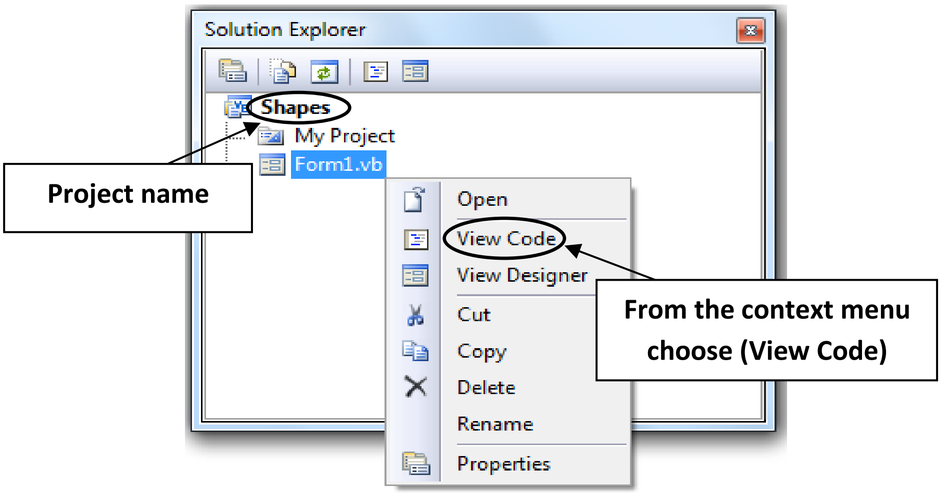


Figure (4-2) to display the Code Window

When choosing (View Code) the following figure (4-3) appears

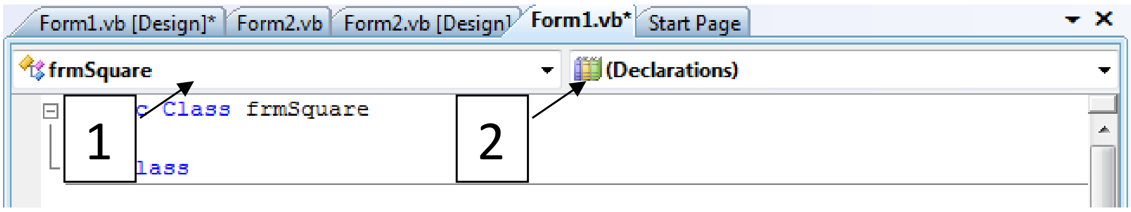


Figure (4-3) the Code Window

The numbers shown in figure (4-3) indicate:

(1) A drop-down menu of (Class Names) that displays the names of controls on the form.

(2) A drop-down menu of (Method Names) or events; associated with the item selected from the (Class Names) menu.

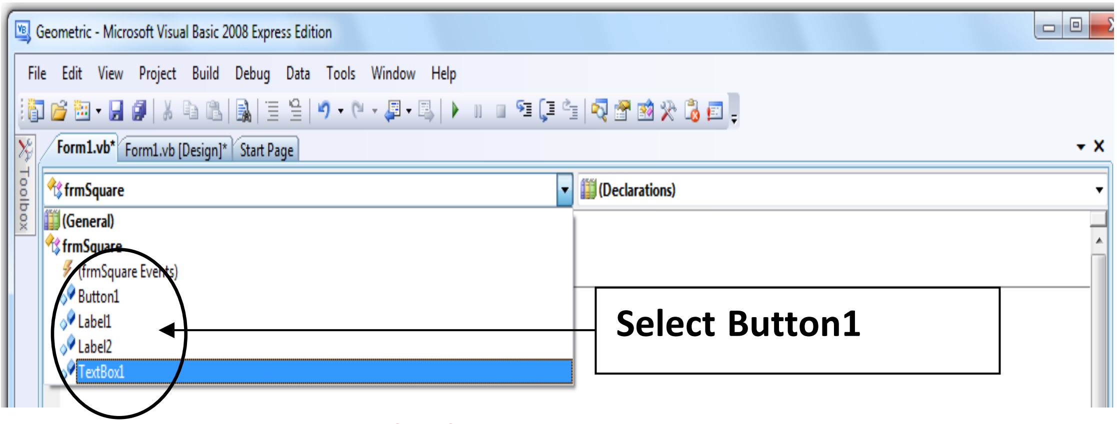


figure (4-4)display control names in the Code Window

2- Open (Class Name) menu and note that the default names of the controls are listed as shown in figure (4-**4**).

Suppose that the window of the form used is as shown in Figure (4-**5**)



Figure (4-5) The model window in the new project

without setting (Name property) of controls included on the Form.

3- When you select (Button1) from the Class menu drop down list, open (Method name) menu it displays the events associated with (Button1) as shown in figure (4-6).

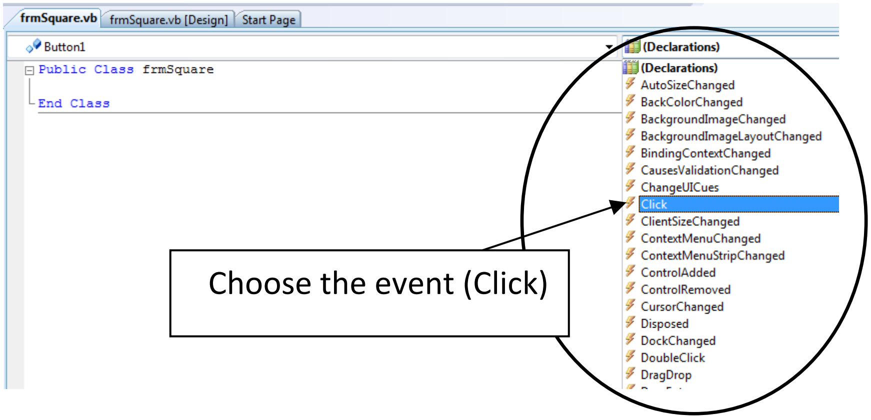


Figure (4-6) choose the required event from the drop-down menu

(Event handler) **as shown in figure (4−7):**

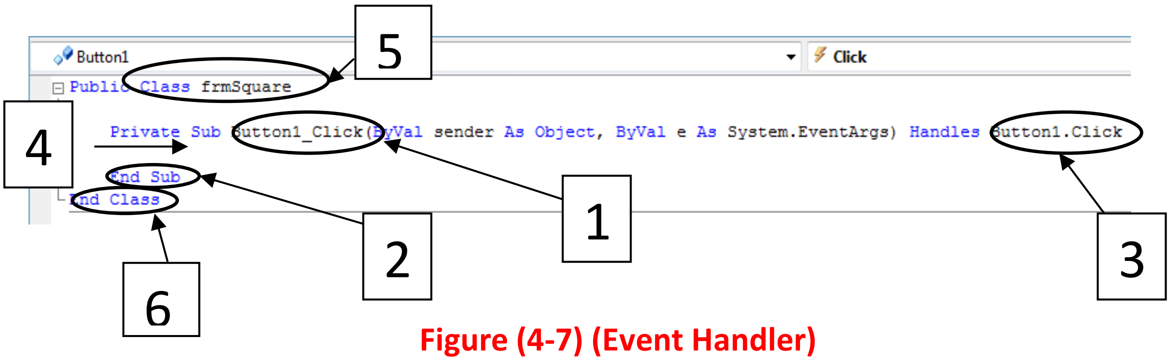


Figure (4-7) (Event Handler)

The numbers shown in figure (4-7) indicate:

(1) The procedure name composed of (object name, event name).
(2) End of procedure line.
(3) What causes the call of the procedure (event occurrence) .
(4) Between the two lines shown; the code that will be executed on calling the procedure is written after the occurrence of the (Event
(5) The declaration of the class line (frmSquare)
(6) The end of (class) line.

5-Adjust the property (Name) for the following controls as shown in table (4-1).

No	control	Value of the property(Name)
1	Button1	btnCalculate
2	Label1	lblLength
3	Label2	lblResult
4	TextBox1	txtLength

Table (4-1)

After setting the properties, select (Code) from (view) menu.

Open the (Class) menu and note that the displayed names of the controls have been changed as shown in figure (4-8).

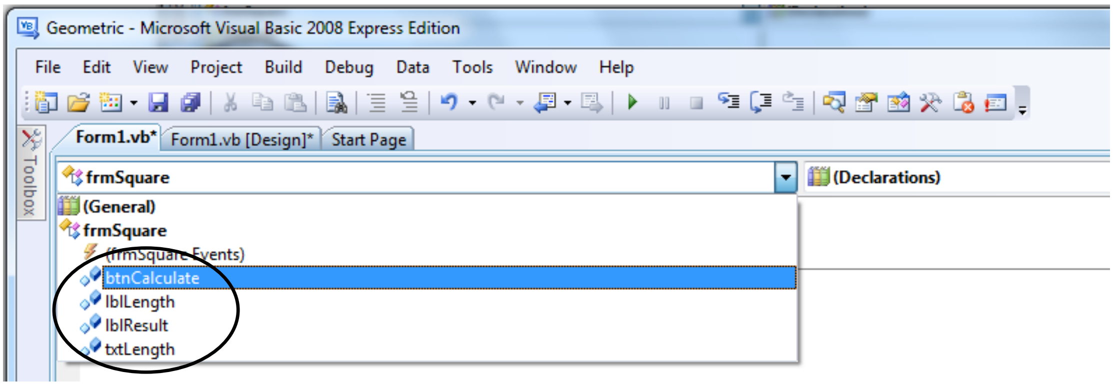
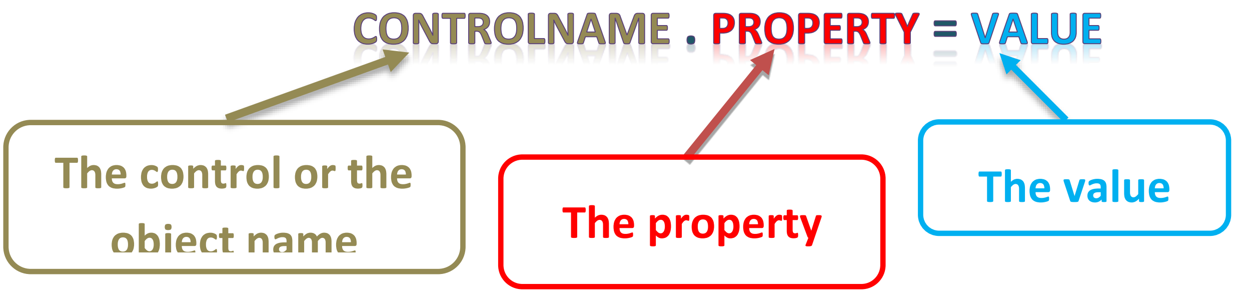


Figure (4-8) the displayed new Names of the (Controls)

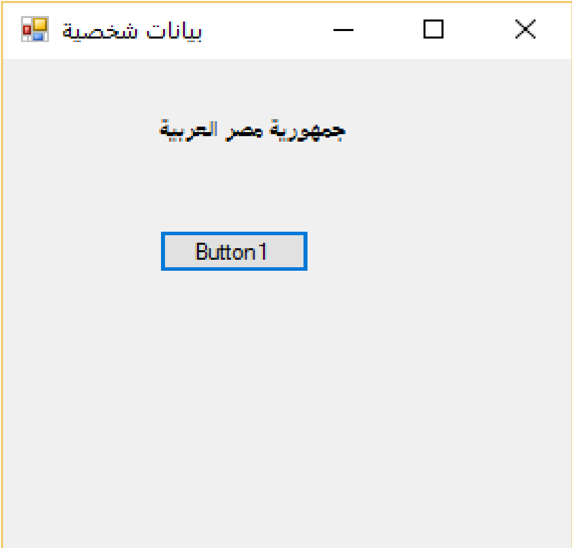
4–3 Setting the (Properties) programmatically

In chapter 3, we have already set the properties through properties window. **You can adjust the properties using the following syntax:**



Example:
Write the following code in the appropriate event handler (Button1_Click) for button1

```
Private Sub Button1_Click(sender As Object, e As EventArgs) Handles Button1.Click
        Label1.Text = "جمهورية مصر العربية "
End Sub
```

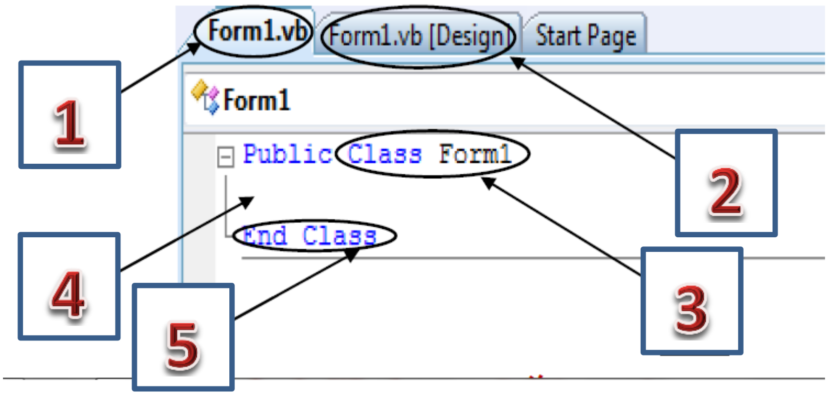


When the event occurs, formwindow appears, as shown in a figure (4-9):

Figure (4-9) the form window after the occurrence of click event

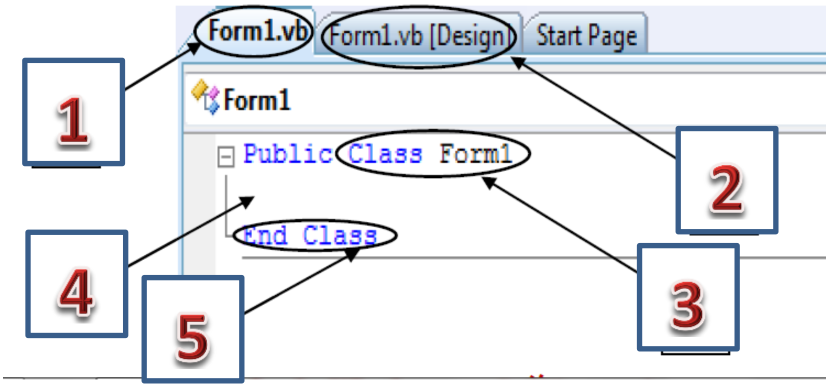
Questions

1) **Complete the table with a number from 1 to 5 using the next screen to express every number to what it refers to:**



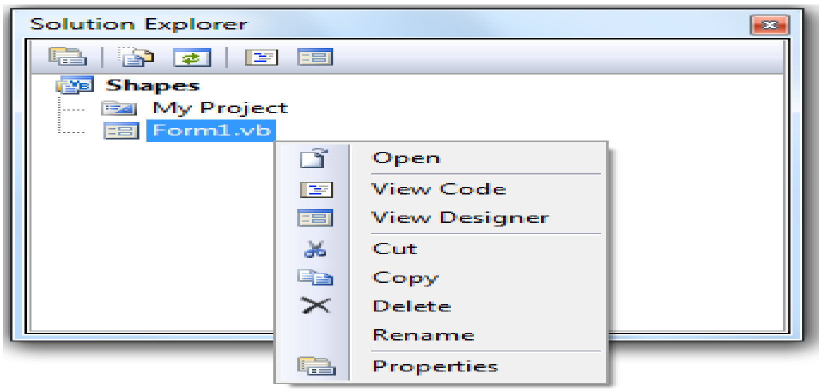
Number	Indicate
(........)	The end of class
(........)	The place to write the codes of the class
(........)	The name of the file that saves the design of the form interface
(........)	The name of the file that saves the code
(........)	The start of the class

2) **Complete the table using the next screen:**



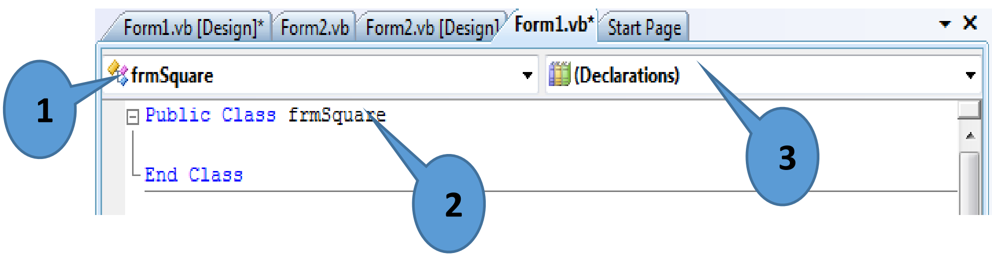
No	Indicates
1	…………………………………………………………………
2	…………………………………………………………………
3	…………………………………………………………………
4	…………………………………………………………………
5	…………………………………………………………………

3) **complete the table using the next screen :**



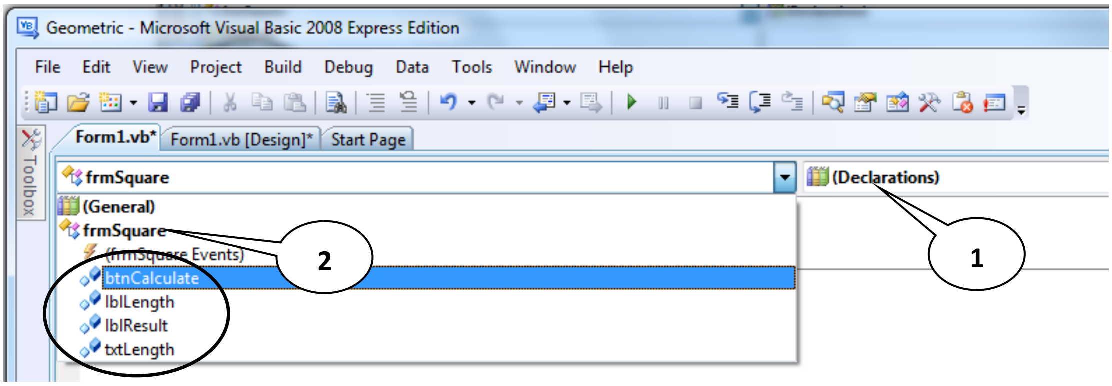
Question	indicates
1	The name of the solution is ………………………………
2	The name of the project is………………………………
3	We can enter the code window more than one way, through : • Command …… in the shortcut menu ………… • function key …………….
4	The purpose of properties in the shortcut menu is ………………………………………………………

4) **Complete the table using the following screen :**



Answer the questions using the following screen:

N	indicates
1	....
2	....
3	....



1- The number of forms is ....

2- number (1) refers to ....

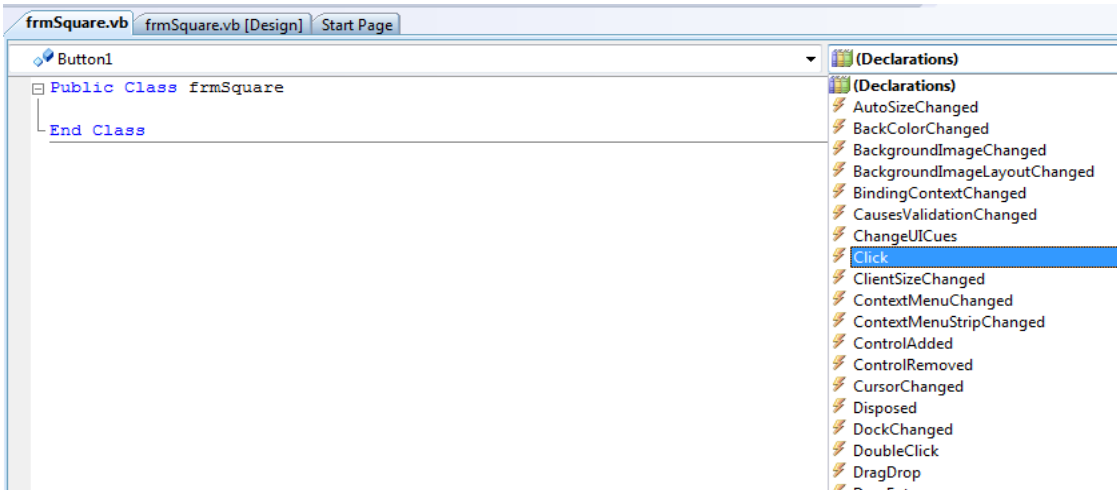
3- number (2) refers to ....

4- List three different control tools from the previous screen

- ....
- ....
- ....

5- The name of the class is ....

5) **Answer the question using the following screen :**



a- From the previous screen write 3 different events :

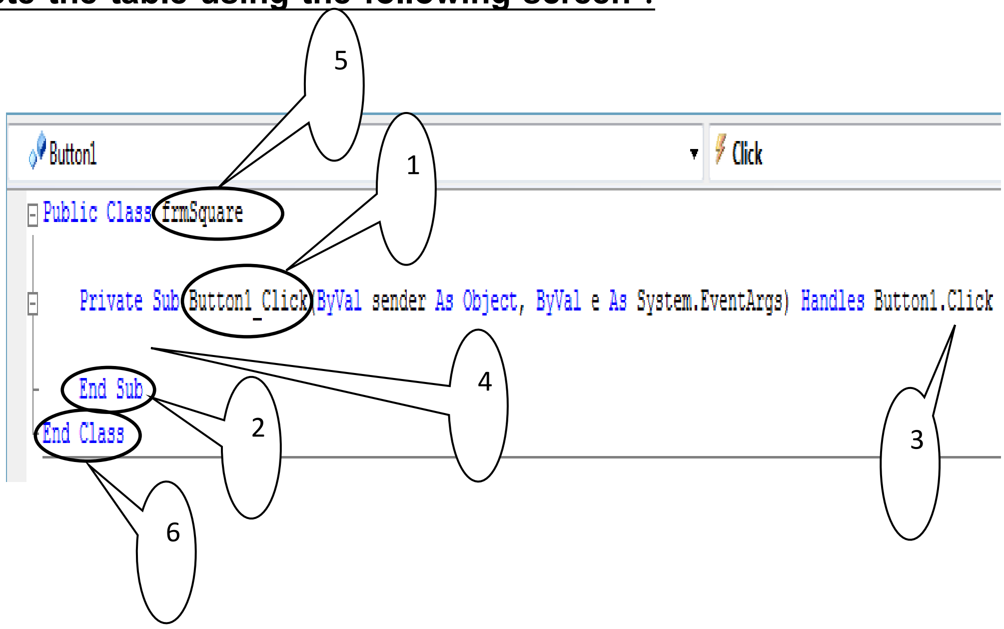
…………… …………… ……………

b- **frmSquare** refers to …………………

c- The events in the window belong to the control …………………………………..

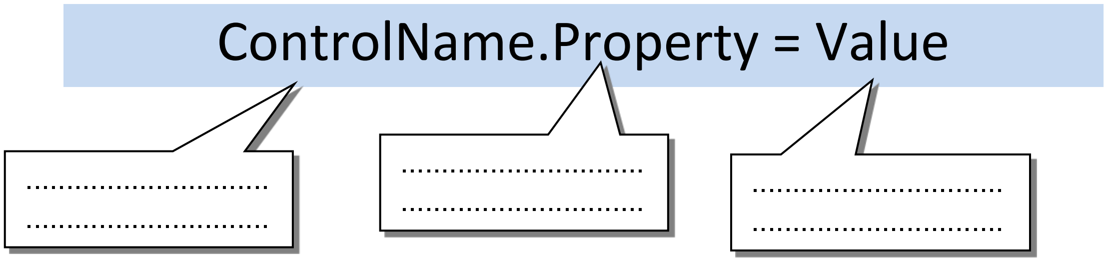
d- The name of the active tab in the window is …………..

6) <u>Complete the table using the following screen :</u>



NO.	indicates
1	…………………………………………………………………………
2	…………………………………………………………………………
3	…………………………………………………………………………
4	…………………………………………………………………………
5	…………………………………………………………………………
6	…………………………………………………………………………

7) **<u>Explain the components of the general syntax to adjust the properties of controls programmatically</u>:**



8) **<u>Explain the following codes through your pervious study for the general syntax to adjust the properties of control programmatically :</u>**

(A) Button2.Text = "END"

....

(B) Label1.AutoSize = True

....

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